

AMENDMENT UNDER 37 CFR 1.116
U.S. Application 09/619,560

REMARKS

Claims 3 to 5 have been amended to depend from existing claim 1 rather than canceled claim 2. Claims 16 to 18 have been amended in order to depend from existing claim 10, rather than canceled claim 15. Claims 5 and 18 have been amended to correct a typographical error by including the definite article "the" before the term "first crystalline molecular sieve." New claims 20-22 have also been added which specify the use of transalkylation catalyst containing MCM-22 or MCM-22 and TEA-mordenite.

Applicants respectfully request entry of this Amendment and reconsideration of this application, as amended. The claims have been amended to comply with a requirement of form made by the Examiner; moreover, the above amendments are timely inasmuch as a Request for Continued Examination is being filed herewith. Support for new claims 20-22 can be found in claims 3 and 4 as originally filed.

Claims 1, 3 to 14 and 16 to 22 are presently in the application.

Rejection Under 35 USC 112, Second Paragraph

The Examiner has rejected claims 3 to 5 and 16 to 18 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention inasmuch as they depend from a canceled claim.

This rejection is respectfully traversed.

By the present amendment, applicants have amended claims 3 to 5 and 16 to 18 to depend from an existing claim, rather than a canceled claim. Accordingly, it is respectfully submitted that the claims as amended meet the requirements of 35 USC 112. Accordingly, withdrawal of this rejection is respectfully requested.

Rejection Under 35 USC 103(a)

Claims 1, 3 to 14 and 16 to 19 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaufman (U.S. Patent No. 3,385,906) in view

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of Cheng et al (U.S. Patent No. 5,557,024). In particular, the Examiner argues that Kaufman teaches reaction of benzene with propylene in the presence of an alkylation catalyst to produce cumene-containing product from which is separated a majority of cumene. The remaining effluent is combined with benzene and transalkylated over a catalyst such as zeolite Y. Acknowledging that Kaufman fails to disclose the presently claimed process using a mixture of two different molecular sieves, claim 6's co-extrusion step, or the alkylation catalyst of claim 14, the Examiner relies on the Cheng reference for its disclosure of the use of MCM-22, MCM-49, zeolite Y, zeolite beta and mordenite, including TEA-mordenite, as transalkylation catalysts. According to the Examiner, it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the process of Kaufman by utilizing a combination of any two of the transalkylation catalysts disclosed by Cheng because each of these is individually used as transalkylation catalysts. The Examiner further argues i) co-extruding the catalyst as required by present claim 6, would have been obvious given Cheng's disclosure of extrusion as a common method for production of a catalyst, ii) using MCM-56 alkylation catalyst as disclosed by Cheng in transalkylation would have been obvious to one skilled in the art because of MCM-56's "high activity and selectivity for the desired alkylated product" and iii) one skilled in the art would have utilized small crystal (less than 0.5 micron) TEA-mordenite inasmuch as Cheng discloses its use as a transalkylation catalyst.

In response to applicants' arguments that the claimed process produces superior and unexpected results given the data provided in the Examples of the specification, the Examiner has abandoned his earlier argument that the experimental data relied upon by applicants fail to show "superior results." Instead the Examiner now argues the showing made by the experimental data is not commensurate with the scope of the presently claimed invention inasmuch as the "claimed process is not limited to the specific ratios of the catalysts as described in Examples 5-7 in the specification" (Office Action of August 5, 2002, page 4, lines 9 and 10).

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This rejection is respectfully traversed and reconsideration is requested.

Applicants direct the Examiner's attention to the accompanying Rule 132 Declaration of Jane Cheng which shows unexpected improvements in the present invention for catalyst mixtures of TEA-mordenite and MCM-22, a molecular sieve having a X-ray diffraction pattern including d-spacing maxima at 12.4 ± 0.25 , 6.9 ± 0.15 , 3.57 ± 0.07 and 3.42 ± 0.07 Angstrom, over varying weight ratios of TEA-mordenite and MCM-22 (1:1 and 2:1 TEA-mordenite to MCM-22).

Kaufman teaches the use of zeolites such as faujasite, and zeolites L and Y, in transalkylation of benzene and by-products of benzene alkylation with propylene, but fails to disclose or suggest any of the presently claimed molecular sieves, much less the specific combinations of MCM-22 type material and zeolite beta or MCM-22 type material and mordenite, to which the present claims are limited. Accordingly, it is respectfully submitted that one skilled in the art acquainted with Kaufman and Cheng (which also fails to suggest or disclose the present combinations of molecular sieve for the process now claimed) would not be led to the present invention. Moreover, neither of these references teaches nor suggests the unexpected improvements obtained by the combinations of molecular sieves in the process of the invention now claimed.

Finally, applicants respectfully submit that the present claims, inasmuch as they are now further supported by the Rule 132 Declaration of Jane Cheng, are now commensurate in scope with that subject matter shown to provide unexpected results in the Examples. It is unexpected that (a) a mixture of MCM-22 and mordenite would exhibit an advantageous combination of high diisopropylbenzene conversion activity, high cumene selectivity and low ethylbenzene and n-propylbenzene selectivity as compared with each of the catalysts on its own, and (b) a mixture of MCM-22 and zeolite beta would exhibit an advantageous combination of high diisopropylbenzene conversion activity, high cumene selectivity and low ethylbenzene, 2, 2-diphenylpropane and n-propylbenzene selectivity, as compared with each of catalyst by itself. Moreover, it is unexpected that a mordenite/MCM-22-type mixture with a 2:1 weight ratio would exhibit improved cumene selectivity of 99.3% versus mordenite alone

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(99.2%) or MCM-22 alone (98.5%) (See TABLE A of attached Declaration of Jane Cheng).

Accordingly, it is respectfully urged that the Examiner withdraw this rejection in view of the surprising results of the presently claimed subject matter and the additional data presented in support of patentability. Allowance of the present claims is therefore respectfully requested.

CONCLUSION

In view of the foregoing comments, entry of this Amendment and allowance of this application is earnestly solicited.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The following changes are being made to claims 3 to 5 and 16 to 18, inclusive:

3. (Amended) The process of claim [2]1, wherein the first crystalline molecular sieve is selected from MCM-22, MCM-36, MCM-49 and MCM-56.
4. (Amended) The process of claim [2]1, wherein the second crystalline molecular sieve comprises TEA-mordenite having an average crystal size of less than 0.5 micron.
5. (Amended) The process of claim [2]1, wherein the transalkylation catalyst comprises about 15 to about 50% by weight of the first crystalline molecular sieve and about 15 to about 50% by weight of the second crystalline molecular sieve, based on the total weight of molecular sieve material in the catalyst.
16. (Amended) The process of claim [15]10, wherein the first crystalline molecular sieve of the transalkylation catalyst of step (b) is selected from MCM-22, MCM-36, MCM-49 and MCM-56.
17. (Amended) The process of claim [15]10, wherein the second crystalline molecular sieve of the transalkylation catalyst of step (b) comprises TEA-mordenite having an average crystal size of less than 0.5 micron.
18. (Amended) The process of claim [15]10, wherein the transalkylation catalyst of step (b) comprises about 15 to about 50% by weight of the first crystalline molecular sieve and about 15 to about 50% by weight of the second crystalline molecular sieve, based on the total weight of molecular sieve material in the catalyst.